



## Understanding comfort and senses in social practice theory

*Insights from a Danish field study*

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# **Understanding comfort and senses in social practice theory: insights from a Danish field study**

## **Abstract**

Thermal comfort is central to energy consumption in housing and one of the main drivers behind worldwide GHG emissions. Research on residential energy consumption has therefore addressed comfort in relation to indoor temperatures. This paper argues that by widening the focus of comfort to include other aspects such as air, light and materials, more sustainable ideas of residential comfort might be developed. The paper takes a practice theoretical perspective but argues that the senses should be better incorporated into the approach to understand different aspects of comfort. The paper investigates how comfort can be understood as sensorial within theories of practice. This implies understanding how the senses are incorporated in embodied and routinized social practices, through which comfort is sensed and interpreted. Comfort is related to a range of everyday practices in the home, and the paper describes how aspects of comfort are perceived differently within different practices. The study is based on qualitative interview data from a Danish field study. However, the findings on how comfort in houses can be understood have a broader relevance as well. It is argued that this nuanced perspective on comfort can contribute to widening the debate and policy on residential energy consumption.

## **1. Introduction**

Energy consumption for heating and cooling buildings worldwide is one of the biggest energy end-uses; it is steadily increasing and constitutes between 20 and 40 per cent of all energy consumed in developed countries, and a primary policy approach to deal with this trend has been to increase the energy efficiency of buildings (Pérez-Lombard, Ortiz, and Pout 2008). However, in Denmark, like in many other North European countries, the overall heat consumption in households is rather stable, despite a growing low-energy housing stock and energy-efficient refurbishments (Danish Energy Agency 2014). Socio-technical research has pointed to increasing expectations of thermal comfort as one of the possible explanations for why heat consumption has not decreased notably in line with efficiency gains (Gram-Hanssen 2015; Shove 2003; Strengers 2008, 2013). Therefore, future comfort and energy consumption need to be examined by debating the meanings of comfort in order to

understand and adopt a more flexible and sustainable concept of comfort (Chappells and Shove 2005). Following this, understandings of comfort need to be scrutinised rather than being *“taken for granted and thereby naturalising meanings and expectations of comfort that are ultimately unsustainable”* (Chappells and Shove 2005, p. 33). One purpose of this paper is to examine such meanings of comfort in order to expand the notions of comfort and in so doing suggest alternative ways of attaining comfort than the dominating focus on thermal comfort.

Recent socio-technical research has worked on understandings of comfort and has linked these understandings to households' heating practices as well as other daily practices to keep warm or cool (Shove 2003, Strengers 2008, Gram-Hanssen 2010, Hitchings 2011, Jalas and Rinkinen, 2013). This follows the line of practice theoretical approaches, stating that energy is consumed in the course of accomplishing social practices (Shove and Walker 2014, p.47). Comfort in this approach has hitherto been investigated primarily as thermal comfort, and not in a broader understanding that includes other aspects of comfort such as softness or fresh air. The strong focus on thermal comfort relates to the fact that energy used in buildings is mainly related to maintaining certain indoor temperatures. This article seeks to explore how including other aspects of comfort can contribute to providing new insights into buildings' energy consumption. This entails a broader focus on how material, social and sensory aspects together constitute comfort in homes. The sensory part of comfort; how comfort is sensed from day to day has not been thoroughly scrutinised in the bulk of socio-technical research on comfort and energy consumption in light of social practices. As stated by Wilhite and Wallenborn (2014), to a large extent the body has been absent from theories of practice as well as from energy research. Therefore, this paper scrutinises empirical aspects of sensory understandings of comfort in social practices, entailing a comfort perspective that goes beyond thermal comfort. Using theories of practice as a point of departure, the empirical analysis centres on the human dimension of energy consumption, as called for by Sovacool (2014), seeking to understand people's energy use through the senses as well as social and material aspects within social practices. The main purpose is thus to investigate how comfort is sensed and perceived in everyday practices through various comfort aspects. In doing this, an additional purpose of the paper becomes to look for and discuss ways of including sensorial aspects into theories of social practices.

## **2. Social practices, comfort and the senses**

### *2.1 Practices between the individual and the collective*

Within energy consumption research there has been a growing interest in studying everyday practices and understanding energy consumption through a practice theory approach, which implies an understanding of energy consumption as the outcome of routinized practices (Shove and Walker 2014). The practice theory approach bridges the dualisms between actor and structure, social and material, as practices are regarded as being at the centre of understanding social life: *"The social is a field of embodied, materially interwoven practices centrally organized around shared practical understandings"* (Schatzki 2001, p. 12). Everyday practices are considered to be routinized and embodied, which makes a central statement in understanding everyday life and residential energy consumption. Bodies and practices constitute each other in this embodiment of practices, which characterise how human activity is entwined with the human body (Schatzki 2001). Furthermore, everyday practices are materially mediated and rely on shared skills and understandings, or know-how, that are also embodied. Thereby *"the skilled body"* becomes the centre of both mind and activity, and of individual activity and society (Schatzki 2001, p. 12). Practices are both shared as collective entities, for example practices of heating and airing, and performed individually. Schatzki uses the term intelligibility to describe the individual phenomenon of what makes sense to practitioners in performing practices (Schatzki 2002, p.110). This practice as performance is the actual carrying out of a practice, as practices have to be performed in order to be realised, sustained and reproduced (Schatzki 1996; Warde 2005). McMeekin and Southerton note that practices as performances attend to daily activities on the micro level and how these are produced and reproduced, thereby presenting the individual *"as the intersection of practices"* (McMeekin and Southerton 2012, p. 351). Reckwitz further states that individuals are carriers of many different practices in routinized ways of understanding, knowing and desiring, both bodily and mentally (Reckwitz 2002). Therefore, social practices are both individually performed and collectively shared.

## 2.2 Comfort in practices

Several researchers have approached the concept of comfort within the practice theory framework to understand everyday practices related to energy consumption and comfort (Shove 2003; Shove et al. 2008; Strengers 2008; Gram-Hanssen 2010; Hitchings 2011). Shove brought forward the concept of comfort as a socio-technical issue, by scrutinising how conventions of comfort have co-evolved through history in a dialectic relationship between technological development, policy and legislation, marketing and everyday life (Shove 2003). Furthermore, Chappells and Shove (2005) stated that comfort is a negotiable socio-cultural construct as it is both an idea and a material reality. Gram-Hanssen (2010) used practice theory to investigate differences in how comfort is practiced in the same

historical and technical setting, with households representing different socio-material configurations of meanings, know-hows and knowledge. Strengers (2008, 2010) studied how demand-management programmes shape and sustain comfort expectations, norms and practices, in relation to cooling. Thermal comfort practices are here understood as *“the activities householders undertake to heat and cool their bodies and homes”* (Strengers 2010, p. 7313). Strengers and Maller (2011) analysed cooling practices to highlight how public policies on hot weather and heat waves conflict with householders’ everyday experiences and adaptive strategies for adjusting for excessive heat. Hitchings (2011) investigated office workers’ perception of comfort as habitual actions within the specific context of a working environment, understood as a reproduction of social practices and taken-for-granted ambient comfort. Day and Hitchings (2011) wrote about the practices of the elderly to keep warm and showed how practices of keeping warm are shaped by ideas about identity and how certain clothes and objects for keeping warm are inscribed with an old-age identity that elderly people would rather avoid. The above studies focus on comfort as thermal comfort and state that comfort is a socio-technical issue, being both a social idea (norm or convention) and a material reality. The studies also state that comfort practices can be understood as the activities done to obtain comfort and that these activities should be seen as habitual actions reproducing certain social practices which can vary with different ideas of identity and social histories. The studies do not precisely elucidate how the notion of comfort, as either norms or conventions, as activities, or as materiality and technology, can be conceptualised within theories of practice, and aspects of sensations are not profoundly discussed in relation to theories of practice within this literature. Therefore, there is a question of how comfort can be understood as sensed and perceived within social practices and the surrounding material environment. To scrutinize this, a perspective of the body and the senses is needed (Wallenborn and Wilhite 2014).

### 2.3 *The body and the senses*

Practices are understood as embodied habits and thus the body is included in theories of practices. However, the perspective of bodily senses has not been thoroughly scrutinised. A sensorial and embodied approach in the social sciences rejects a division between body and mind, behaviour and perception, as also developed in phenomenological and practice theoretical work. Several senses are at play in perceiving and practising a comfortable home environment, especially as *“the senses are skills for embodied action”* (Vannini 2011, p. 1269). For example, senses like smell and touch are relevant in a study of comfort as well as the sense of thermoception, which allows us to perceive heat and cold (Vannini 2011). Pink also argues that, although sight has been privileged in the Western discourse, this

is not necessarily the case when studying domestic everyday life. Pink shows how metaphors of senses such as touch, smell and hearing represent embodied experiences of home-making practices (Pink 2004). Such practices are seen as embodied actions through which individuals engage with the sensory environments of their home, for example by cleaning, cooking, playing music, burning oils or candles and choosing the floor type (Pink 2004, p.10). Pink and colleagues partly combine practice theory with a sensory ethnography rooted in phenomenological anthropology from Ingold, thereby moderating the analytical priority of practices, though maintaining a focus on practical activity (Pink et al. 2013). The authors also partly criticise practice theory from this approach and argue that practice theory, as it has been unfolded in much sociological research, has a tendency toward abstraction and generalisation and thus tends to forget what people are actually doing and feeling. Watson, however, in a direct comment on this, argues that a uniting feature of theories of practice is an understanding of practices as constituted by and reproduced through practical activity (Disalvo, Redström, and Watson 2013). Watson further argues that, to a high degree, theories of practice and phenomenological anthropology share common roots in the philosophy of e.g. Heidegger and Wittgenstein. We are inspired by the sensory ethnography approach as developed by Pink and colleagues, though we follow the line of Watson in arguing that this approach does not stand in opposition to understandings in theories of practices as developed by Schatzki and others, described in the previous paragraph. Rather, we will argue that the detailed interrogation of bodies and minds in places and spaces, as described by Pink et al., contributes in developing approaches of practice theory that are especially interested in understanding the role of context and individual variation. This implies a stronger focus on the individual in the performance of practices with a focus on the sensory experiences and perceptions of both material surroundings and social phenomena. Pink et al. further state that *“to understand how and why people consume energy in their homes we ask how people live, move and know in these environments”* (Pink et al. 2013, p.25:4). This approach helps to focus on how people feel and perceive material and sensory elements of homes as places, situating perception and practice within the surrounding environment (Pink et al. 2013). Similar to this, the present paper argues that, to understand everyday comfort and its relation to energy consumption, comfort should be investigated as a social phenomenon that is bodily sensed on an individual level as well as shared as social conventions that are interpreted in everyday life at home.

### 3. Methods and data

The paper is based on a field study using qualitative methods among residents in single-family housing in the suburbs of Aarhus, the second largest city in Denmark. The study consisted of 17 interviews

with 14 different households, during two successive heating seasons. The interviews took between half an hour and one and a half hours. The participants were selected from three groups of single-family housing that related to the building age (see table), reflecting changes in the energy efficiency requirements in the Danish Building Regulations. All households were connected to district heating, and therefore housing with other primary types of heating that may have different heating routines, was left out. Thus, the study represents a specific suburban context, geographically and socio-economically. The participants vary in relation to gender, age and family types (see table); however, they represent a rather homogeneous socio-economic group that could be characterized as lower to upper middle class. Except for one tenant, they were all house-owners. The aim was not to construct a representative study, but to have a varied group of participants within this specific housing type, in order to give a more varied picture of the everyday practices related to comfort. Age and gender differences in the material could influence perceptions and practices related to comfort, however, these were not the focus of this paper and therefore have not been elaborated on. The participants did talk of differences between themselves and their partners, which might be gendered, there were also some indications that age changed perceptions of temperature, and that family type played a role in how houses were used and perceived as comfortable. The purpose of this paper was rather to find similarities in patterns of comfort across the data. The qualitative study is based on one specific, contextualised case and the results cannot be generalised to apply in all other contexts. However, we argue that practices and ideas of comfort show similarities to a broader Scandinavian context with comparable climate as well as ideas and materiality of homes. Furthermore, through the analysis incorporating theoretical concepts, the results can point to general findings in understanding comfort as a concept in relation to detached housing.

In-depth interviews were carried out in the dwellings of the participants, and each interview was supplemented by a 'home tour'. These qualitative interviews were used to provide knowledge about the life worlds of the participants and in-depth understanding of their perceptions and activities (McDowell 2010). The interviews had a flexible thematic structure, with a semi-structured question guide framing the interview, but which allowed for each interview to follow the specific interaction of the interview process (Holstein and Gubrium 2010). The interviews centred on the participants' everyday life, with specific interest in how comfort is experienced and related to the home and energy consumption. The questions concerned the participants' activities during a normal day, specifically management of temperatures and the indoor climate, how they used the house and specific rooms, what comfort meant to them in relation to this, and how and where they felt most comfortable in their home. The interviews engaged more broadly with the participants' everyday practices related to comfort and energy consumption, though for the purpose of this paper, the analysis focused primarily

on sensations and perceptions of comfort. The interviews were recorded and transcribed and all participants have been given pseudonyms to secure anonymity. Further, quotes have been translated from the original language (Danish) to English. The interviews were coded by the main author through an iterative process searching for patterns elaborating on comfort in the data material. This analysis approach was inductive and therefore the following section is based on the four sensorial comfort aspects that turned out to be prominent in the empirical data.

[Insert table 1]

## 4. Four aspects of comfort in social practices

### 4.1 Sensing warmth and coolness

The present study follows the line of Pink and colleagues (2013), that includes a thermal aspect in different domestic practices rather than focusing solely on heating practices. Warmth, or a suitable temperature in the house, was perceived as central to feeling comfortable in the home, as a background to many practices, and often warmth was connected to cosy domesticity:

*“You’re cosy, sitting together, relaxing after the rigours of the day or week (...) it’s a comfortable temperature around 22 degrees, where you’re not cold, it’s also often we bring in the duvet and sit in the sofa, just to have it as part of the cosiness, you could say” (Kasper, 30s).*

The family brought in a duvet for extra warmth and cosiness on the couch, even though they lived in a low-energy house with a high level of insulation and they were content with the temperature in general. Kasper explained that his wife would often bring the duvet when they watched television on the couch in the evenings, and that he would bring it in on weekend mornings, together with his two young children. This was not because they felt cold, but because the duvet was perceived as an element of cosy domesticity. The bodily sensation of a comfortable temperature, together with the soft and warm duvet, is therefore part of feeling cosy and relaxed. Relaxing was a practice that was often related to the comfort aspect of warmth. For example, it was essential to another participant, Claus, that the temperature in his house was always adequately warm, so that he did not have to put on a sweater or use a blanket when relaxing on the couch:

*“(...) it’s nice to be in a home with an okay temperature, it’s annoying if you are sitting in the living room and then you have to get under a blanket or fetch the duvet or something, it’s just nice that you can sit in whatever clothes you feel like” (Claus, 40s).*



This material aspect of duvets and blankets thus also relates to issues of clothing. Claus said that he did not like to put on a warm sweater or socks to keep warm at home; *“then your nose still freezes”* as he said. As such, practices of relaxing, heating and dressing are all influenced by the perceived comfortable temperatures and sensation of warmth, as well as an understanding of how this associates with being at home and with the family. There are, however, different bodily sensations of what a comfortable temperature is, and different perceptions of how this is best achieved within the material structure of the home. In the interviews, comfort was often explained as a bodily feeling of warmth, especially in terms of heated floors, reflecting heating practices and technologies:

*“(...) underfloor heating, I would say it’s lovely, it’s wonderful to walk around on the warm floor, but the radiators, you can turn them up and then the heat comes in a short while, and in the same way you can turn them down, and it’ll be registered quickly, that’s what I had to get used to” (Marianne, 60s).*

The underfloor heating is thus central to Marianne, because she can feel the warmth underneath her feet, but at the same time she finds it difficult to adjust the heating. She has had to change her heating routines since moving from a 1970s house to a house built in 2001. As such, her comfort is both about the bodily feeling of warmth and about her competences of adjusting the heating according to her perception of a comfortable temperature, which can change with practices and seasons.

A difference between warmth and coolness as comfort aspects between the different rooms of a house and the related practices was also apparent. The interviews reflected a cool bedroom as comfortable, in contrast to the warmth of the living room: *“There are different needs, for example in our bedroom we seldom turn on the heating, because we cannot sleep if we feel (...) that the air is dry” (Maria, 50s).* Some of the participants said that, when going to sleep, they felt comfortable with their bedroom at a much lower temperature than in the rest of the house; this was related to the specific practice of sleeping as opposed to practices situated in the living room, as well as the material setting of the bed and duvets providing warmth. Some aired the room and some kept a lower temperature in the room: *“(...) in the bedroom we close the door, we like it to be ice-cold in there” (Linda, 40s).* Kasper had some trouble maintaining a lower temperature in the bedroom of their low-energy house, which he and his wife felt was most comfortable, and therefore they aired the room before going to bed: *“We always open the window in the bedroom in the evening to cool it down, so that we have a more comfortable temperature when we go to sleep in there” (Kasper, 30s).* Hence, the participants perceived a cool room as comfortable for sleeping, but a warm room as comfortable for relaxing, and this again reflected their practices of heating and airing. Also, the spectrum between warm and cold was apparent in relation to the bathroom. In Denmark, many older detached houses only have underfloor heating in the

bathroom, while newer detached houses often have underfloor heating in the entire house. Jacob explained how this changed the sensation of warmth and comfort in his newly built low-energy house:

*“(...) the old house, what was really pleasant there was to come out into the bathroom where the floor was heated, it really gave this feeling of comfort (...) what we actually felt was comfort and well-being and nice in a bathroom, it’s not there when you create this homogenous temperature all over, and then a floor can actually easily feel a bit cold, even though the heat is coming through there (...) now we wear slippers everywhere all the time, and actually they provide the comfort” (Jacob, 40s).*

The feeling of bare feet on a warm floor was an essential aspect of the family’s perception of comfort in the old house, while they have now ‘lost’ this comfort aspect. However, in general, Jacob was very content with the heating and temperature in his family’s low-energy house, although the new heating system had changed their dressing practice so that they wore slippers. Another important aspect of comfort related to the bathroom was the warm shower, which underlines the bodily sensation of comfort in practices related to this room. Kasper mentioned the shower as a place in the house, where he felt comfortable: *“(...)you just relax and feel good in the warm shower” (Kasper, 30s)*. As such, the bathroom is a place that is related to comfort and warmth in more ways and related to practices of heating, showering and relaxing.

Comfort as warmth and coolness is sensed through the body in several practices such as heating, relaxing, watching television, sleeping and showering, as also shown by Pink et al. (2013). Basically, this comfort aspect is the background to most practices in the home, although some practices are related specifically to sensations of warm and cold, such as heating and airing. Warmth is related to relaxation and cosiness, as was also shown by Wilhite et al. (1996); either alone or with the family, while coolness is related to sleeping. In this way, sensations of warmth and coolness influence how practices are performed. Further, there are different perceptions of warm and cold according to different practices and the specific rooms.

#### *4.2 Sensing air*

Warmth and indoor air are related sensorially, as airing is sometimes performed when it feels too warm inside the house and specifically to cool down a room. Indoor air can be related to many practices in the home, as this is part of creating a comfortable and homely atmosphere forming the background of everyday practices. Therefore, comfortable temperatures, as described above, are not only about warmth, but can also be related to cooling rooms and to airing, and thereby to aspects of

smell and fresh air. Helene focused on fresh air, more than warmth, when explaining how she made herself comfortable:

*"We're probably the types that would rather have fresh air and then put on another sweater, because it should not be smelling of the wood-stove and rather not of smoke (...) I'd rather go and get another sweater than not open the door" (Helene, 40s).*

Helene and her husband rented an older detached house from the 1970s, where usually only the kitchen and the bathroom were heated during the day and the living room in the evenings. The couple had grown-up children and ran a company from home, therefore many employees passed through the house during the day and there was lots of smoke from cigarettes. The family also had a dog that went in and out through the terrace door. As such, airing was an essential practice related to their everyday comfort, while also influencing their dressing and heating practices, as only a smaller part of the house, where they spent most of their time, was heated. Helene explained how it is important to air the house, as fresh air is an essential comfort aspect. This comfort aspect influences her practices of heating and airing, together with many other everyday practices, for instance working from home, having guests or taking care of pets, which was also noticed by Strengers et al. (2014).

Airing is further related to temperature as it might also be about cooling down the house. There were different strategies for defining when a house needs to be aired. For example Camilla, who was pregnant at the time of the interview, said: *"I probably air for a longer time than you [partner] (...) I do it until I don't sweat anymore [laughs]"*. This reflects a sensory know-how of airing as well as a bodily sensation of being cooled. On the other hand, Camilla's partner used rational knowledge of how to air; he had read that the best way to air a home is three times ten minutes each day, and he followed that 'rule' as he found it the best way of providing a good indoor climate for the family. These are different forms of competences in the practice of airing, informed by either a sensation of comfort or knowledge (common rules) about avoiding health issues such as asthma. Therefore, airing, like heating, is a practice related to comfort, that is bodily sensed and important in taking care of a family. Maria also had a sensory perception of when the house needed to be aired:

*"Sometimes I feel, for example if I've forgotten to air down in the basement, then it's like the climate or the air is cramped, it's like it radiates from the furniture and clothes, from all the stuff that's in there" (Maria, 50s).*

This sensation was part of her idea of a comfortable house, as Maria explained that it was important to her comfort that the house was filled with fresh air. Hence, fresh air in the house is a comfort aspect connected to airing practices in the way that airing the house is performed to get rid of 'bad' air (e.g.

smell and damp) and to let fresh air in, to feel comfortable. However, aspects of comfort were related to air in different ways. Some aspects, such as temperature and smell, relate to the practices of having guests or caring for a family:

*"(...) you can feel it immediately when you enter someone's house (...) smell and temperature and indoor climate (...) it also has something to do with getting sick, I really think we have a good example, we think that we have a good indoor climate here, and we haven't been sick, any of us, since we moved in" (Tilde, 30s).*

Tilde is a mother of two young children, and this quote shows how the comfortable indoor climate and temperature is part of caring for her family, in providing a safe and healthy home. This practice of caring for a family by providing a decent home is related to all of the comfort aspects, although it is specifically apparent in relation to air and issues of illness, as air can be perceived as carrying 'bad stuff'. Fresh air and the lack of negatively connoted (unwanted) smells also related to inviting guests into a decent home. Smells, though, could also have positive connotations related to cosiness and homeliness:

*"(...) if it smells new, if it still reeks of plastic paint, or the sense of wood, there could be many, that could have a positive effect in some way... it can't always be smelling of freshly baked buns everywhere, which is some kind of sales parameter, but, there's always something that says; this is a nice place to be" (Jacob, 40s).*

Jacob explained how the sensory perception of the smell of home can vary; essentially all homes have their own smell and this is a central part in feeling comfortable as well as maintaining a home. The practices that are carried out in the home affect smell in positive or negative ways and thereby the issue of indoor air is related to many everyday practices, besides from airing, such as decorating and baking. Furthermore, air that is comfortable and homely can be seen as an outcome of different practices, as smell identifies practices that either have or have not been carried out (e.g. airing, cleaning, cooking). Claus explains how smells are related to a homely feeling and to cooking and baking, for example when returning home from work and someone is preparing food in the kitchen:

*"What I think is nice is when you come home from work, if you're not supposed to cook yourself, it's to smell that there is something when you enter the door (...) it's also something to do with cosiness, also if you come home some day and someone has been so nice as to bake a cake, it's just nice to come home to" (Claus, 40s).*

To sum up, comfort in relation to air is connected to avoiding bad smells, as also addressed by Pink (2004), to enjoying the fresh air from outside (Hauge 2013a) and to producing positive smells through other everyday practices such as cooking. The practice of airing, in this aspect, can be about cooling a room, eliminating odours or simply sensing the fresh air and a connection to the outdoors. Fresh air was related to maintaining a home that is adequate for both having a family and for inviting guests, and specifically, the issue of providing a healthy environment at home is closely connected to the perception of fresh air in the house.

#### *4.3 Sensing light: daylight, lamps and candles*

Lighting, like heating and airing, can be seen both as a comfort aspect in many practices in the home and as a practice in itself. Different aspects of light were mentioned as relating to comfort; daylight coming in through the windows, electric lights and candles. As with warmth and fresh air, lighting was often mentioned when discussing a comfortable home, for example in relation to providing a cosy home for guests: *“(...) when we have guests we have more lights on, and then candles” (Camilla, 30s)*. Camilla explained that they light more electric lamps and more candles when having guests, which underlines how lighting is part of creating a comfortable and cosy environment. In this way, as with temperature and especially fresh air, light is part of the practice of having guests and of maintaining a decent home. Candles in particular are connected to creating a cosy environment; however, they are also related to the practice of heating, as candles also produce warmth. This mostly appeared in the low-energy houses, where the participants living in these highly insulated houses explained that lit candles, together with guests, would affect the temperature in their house:

*“(...) the temperature rises when you have guests because then candles are lit (...) it doesn't take much to make it warmer, then you quickly reach 24 degrees (...) there's not much heat that goes out...so it does get warmer when there's guests” (Erik, 60s)*

Therefore, the building technologies of low-energy houses provide a connection between light and warmth. As with the preceding themes, light can be seen as an essential aspect in most daily practices at home. However, light was also specifically explained as an aspect providing comfort. Linda explained how feeling comfortable in her home has to do with light, either daylight coming in through the windows or lighting candles as part of creating homely comfort: *“(...) now it's bright and the sun is shining, but I think it's just as cosy when it gets dark and we light candles in the autumn and winter” (Linda, 40s)*. This quote underlines how light is both central to wellbeing and to creating a cosy and homely atmosphere, which is also performed according to the changing seasons, as different kinds of

light can be appreciated at different times of the year. Daylight was in itself an aspect of comfort, although this cannot actually be practiced, but is facilitated through a material element; the windows of a house. The perceptions of both light and warmth are related closely to the changing seasons of the Scandinavian climate, just as the notion of cosiness is related to the climate and seasons.

Claus explained how it was important to him and his wife to choose the right kind of electric lighting, that would not just light up the room, but also create a cosy and intimate atmosphere around the dining table in the kitchen-dining area: *"What was very important to us was to have good lighting here, cosy lighting (...) it should be cosy to be here, it should be pleasant, it shouldn't just be neon tubes"* (Claus, 40s). As such, light as a material element forms the background of performing the practice of dining in a comfortable and homely way. To Claus and his wife, this should support the evening meal as being a meeting point for the family, and thereby light is also part of caring for the family, like fresh air and warmth. Light is furthermore part of a decorating practice, with the aim of creating a cosy and comfortable atmosphere in the home. In this way, both light and warmth are used to create cosiness in the home. However, light is related more closely to the materials of and within a home, such as windows and furniture. Windows are associated with comfort by letting daylight and sun into the house and by facilitating a view out of the house, into the garden or the neighbourhood: *"It was this panoramic view that I fell for, it was nice that you could stand there and have so much light in, after all, light does make you happier"* (Behram). Behram's partner is more ambivalent about the windows. She is very content to have the light coming in, and to have the view out into the street, but she does not like the feeling that other people passing by can look in, as it compromises her privacy:

*"One thing that I feel ambivalent about is our window section in the kitchen, on the one hand I think it's great to have so much light coming in, that it faces the way it does, because I can keep an eye on [her son] when he's out, but on the other hand it's very annoying that everyone can look in"* (Camilla, 30s).

In this way, the window as a material structure facilitates the comfort aspects of light coming in and a view out, as also found in Hauge (2013b). To Camilla, this is specifically connected to a practice of caring, or parenting; however it also disturbs her idea of privacy at home. As with the other comfort aspects, light can be seen as an essential aspect of being at home and carrying out all kinds of everyday practices. Light, either natural or electric, is an essential element in most everyday practices that would be difficult to perform in darkness. This comfort aspect is sensed both through the vision and through the body, as rooms are both illuminated, but can also be warmed by light coming from natural sunlight or lighting practices and technologies. In this way the aspects of warmth and light are connected. Light as a comfort aspect is connected to the seasons, as more daylight comes in through the windows, and for a longer time, in the summer season than in winter, where electric light is

needed most of the time. In other ways, candles are used to create a cosy atmosphere for families and guests, especially in autumn and winter. This additionally affects the warmth in a home. As such, light is more explicitly materialised in material structures of a home, such as lamps and the windows that facilitate light coming in. Light can be materialised in other material too, such as furniture as well as walls and ceilings that reflect the light and have lighter or darker colours that affect the atmosphere and sense of light in a room.

#### 4.4 Sensing materials

Everyday practices related to residential comfort are situated in the material and social structure of a home. This section focuses on how the materiality of a home is perceived in relation to comfort, both socially and bodily, and how it differs in different social practices. For example, Marianne explained how the colour and brightness of the furnishing, floors and ceilings, are important to her feeling of comfort:

*"(...) the dark floor and the dark furniture (...) I couldn't stand it, it had to go, it had to be bright (...) I bought these two carpets (...) So it brightened a bit, and then I had all the ceilings painted white, they were whitewashed before, but they had started to get yellowish (...) I felt (...) when I came home; it's so dark, even though I turned on the lights and so on, but now, it's like it's had a boost".*

Marianne refurbished the material environment of her home to have a brighter atmosphere, underlining how light in material structures can also contribute to the feeling of comfort. In this way, light is materialised in the material structures and furniture and part of decorating practices to create comfort. Further, material comfort was perceived as the sensation of soft furniture. For example, a comfortable couch is sensed through the body, for instance the feeling of softness and good support for the back. In this way, the couch as a material object is integrated into various practices related to comfort such as relaxing, watching television, reading or caring for children. Soft furniture was often mentioned as part of feeling comfortable at home: *"(...) to sit in soft furniture, or to lie in a soft bed, then you feel comfortable...or to sit in a good office chair"* (Kasper, 30s). The bodily sensation of softness is part of practices related to comfort, such as relaxation, alone or together with the family, and for some participants it was also related to a good home working environment.

Another comfort aspect closely related to the material structure is the layout and design of a house, which was connected to having adequate space for practising everyday life: *"Now that there are only three of us living here, I think it's the appropriate size"* (Birgitte, 50s). Mostly, space was seen as an essential aspect of a comfortable home and thus as a comfort aspect in itself. Living in a house that felt

too crowded, or in an apartment with neighbours too close, conflicted with the participants' perceptions of comfort, as it was important to have enough space for a family, for instance having a separate room for each family member. For these participants, all living in detached houses, an essential comfort aspect was the space and privacy of the house. The appropriateness of the size and space of a house was also linked to ideas about family life, for example in Behram's case:

*"It would give many problems if we had to move to a smaller apartment, the space here is enough for [his son] to walk and run and we can go outside (...) also there's no one upstairs, no one downstairs, there's no noise and everything, to me that's also some form of comfort" (Behram, 40s)*

As such, the layout and the qualities of the house contribute to the notion of comfort, as these qualities should accommodate different everyday practices of family life. Basically, this is related to taking care of a family by accommodating it properly, which means being able to perform daily practices appropriately and comfortably, e.g. sleeping, playing, dining and working from home. This comfort aspect is specifically related to a practice of decorating, as people shape, create and use the material structures according to their ideas of comfort, but it is also incorporated in the structures of the house and its technologies. The aspect of material stuff incorporates the other comfort aspects in different ways, like heating through the floor, airing through the window or lighting with a lamp. The material structures are both the background for, and part of, practices related to comfort, and furthermore they incorporate specific comfort aspects perceived through the senses. However, this comfort aspect also forms the background for all home-making practices, as these are situated within the material structures of a house, including furniture.

## 5. Discussion

Senses are not very explicitly dealt with in the research on comfort and energy inspired from theories of practice. However, they are central to understanding comfort in housing, as this analysis shows. Wallenborn and Wilhite (2014) have taken some steps towards bringing the body into theories of practice, by focusing on the embodied knowledge and perception, although without an explicit interest in the sensorial link between the body and the material environment in practices. Based on our analysis, in the following discussion we proceed to bring the senses into theories of practice in relation to indoor comfort. Firstly, we discuss how comfort can be seen as more than thermal, as different aspects of comfort are interrelated in sensorial ways in practices. Secondly, we discuss how aspects of comfort can be understood as incorporated materially in practices or as material arrangements



surrounding practices, and practices can be performed to obtain comfort. Thirdly, we discuss comfort as shared social understandings.

Comfort is an overall bodily involvement with the surrounding environment, as it is sensed through the different senses such as vision, touch, and olfaction, for instance by way of feeling soft furniture, a warm indoor environment or breathing in fresh air. In the analysis, it was shown that different sensations were interrelated in practices. This means that more senses were at play at the same time when perceiving comfort, which shows how senses should be studied in a close interrelationship with no one sense dominating the others, as argued by Pink (2009). The analysis also showed that the comfort aspects of warmth and coolness, air, light and material stuff interrelate in different ways, according to the different practices they are part of. For example, warmth is related to the softness of the material of furniture such as the bed, the couch, armchairs or office chairs, and to other materials such as clothes, duvets and blankets as well as to the materiality of building components such as the floor. When relaxing, watching television or working from home, both warmth and softness are essential aspects of feeling comfortable. Similar relations between warmth and softness are also reported in Pink et al. (2013). However, when it comes to warmth and coolness, there is a difference in how the materials form part of practices. In the living room, the duvet is brought in to an already warm room, while the bedroom is preferred to be cool and the duvet and the bed provide warmth. In this way, the analysis showed how comfort is sensed differently according to the relation between the aspects of comfort and different everyday practices. In terms of warmth and coolness, there is a clear distinction between when a warm room is felt as comfortable and when a cool room is comfortable, which is related to the specific practices performed in the rooms. Pink et al. (2013) showed how residents move around a home linking peoples' senses and notion of comfort to movements and places in the home, and to the *"on-goingness of practical activities/practice as it is woven into the template of the home as it is made"* (Pink et al., 2013, p 25:4). Instead of developing theories of practice to include senses, Pink and colleagues argued for using a phenomenological perspective derived from Ingold in understanding the sensorial. The analysis in this paper showed how senses mediate perceptions of comfort in social practices, influencing both how comfort is perceived in different practices and how practices are performed. Thus, we argue that a sensorial perspective can be used together with theories of practice in understanding aspects of comfort and the related practices.

Specifically related to thermal aspects, Chappells and Shove (2005) have argued that comfort can be seen as a material reality, and Jensen (2014) has argued that lighting should be viewed as a material element in practices. We add that this accounts for all sensorial aspects of comfort including warmth, fresh air, light and materiality. The aspects of comfort that are dealt with in this paper can be seen as both material elements in practices, such as warmth, fresh air and light, and as signifying specific

practices, such as heating, airing and lighting. Warmth, air and light thus form the background as 'invisible materials', or material arrangements, to an array of practices. It is difficult to imagine everyday practices that would be comfortable, at least in a Danish winter, without the house being heated and the lights turned on. At the same time, however, heating, airing and lighting are also practices in themselves aiming to create a comfortable indoor environment, as has been dealt with in other practice theoretical studies, primarily related to thermal comfort (Gram-Hanssen, 2010; Hitchings 2011; Strengers 2010). Thereby the analysis showed a duality in comfort aspects. On the one hand comfort aspects form a material background for everyday practices and on the other hand specific practices are performed to maintain comfort. The link between comfort as a material background and comfort in practices is in the sensing of (all) the aspects of comfort. The embodied know-how of practices links the sensorial inputs to the performance of practices in maintaining a comfortable indoor environment. In terms of such sensory experiences and bodily know-how of managing comfort, we were inspired by Royston (2014), who showed how a variety of sensory perceptions (thermoception, touch, vision) of temperature are used in heat management in homes, arguing that know-how is both embodied and conscious as well as related to life-courses, material arrangements and social conventions. We were inspired by this way of linking between the senses and know-how in the performance of practices. However, Royston (2014) is explicitly interested in understanding know-how related to managing the heating of a home, whereas our interest is in using this sensorial approach to include other aspects of comfort in practices than those related directly to heating.

The perceptions of the comfort aspects of warmth and coolness, air, light and material stuff are manifested in the material structures constituted by the house and its technologies that influence how practices are sensed and performed. Furthermore, the perceptions of comfort are shared between individuals by social norms, for instance how to care for a family or maintain a decent home for guests; this argument follows the line of other studies on comfort (Day and Hitchings 2011; Hitchings 2011; Strengers 2008; Wilhite et al. 1996). Health and care for the family is an important issue in the perception of comfort and the related practices. Hauge (2013a) described this in terms of fresh air, as the comfort of fresh air is part of being a host and caring for the family, with the normative aim of providing a healthy, welcoming and cosy atmosphere in the home. The social relations of family were important for feeling comfortable, for example, participants mentioned social gatherings with their family in the kitchen-dining area, however, they also mentioned the bathroom as comfortable because of the privacy. Thus, both togetherness and privacy characterise practices related to comfort. The spatiality and movement around the house are then interesting to bring into these analyses of the performance of different practices and different notions of comfort, as noted by Pink and colleagues

(2013). The participants reflected on comfort in relation to different dwellings and situations during their life course. In the Danish context, single-family housing often reflects a specific part of life, such as becoming a family with children and two incomes, as well as moving 'upwards' in accommodation standard and comfort level. Practices are partly constituted by such meanings or teleoaffective structures (Schatzki 1996) that outline normative ideas of practices; for example what a comfortable temperature is, how an ideal home should be designed and used and how to best take care of a family or have guests visiting. Teleoaffective structures describe normative aims in practices, and these social meanings are connected to, and materialised in, the physical structures of a house, the things and technologies within it, and the know-how of using them. The sensations of hot and cold, air, light, spaciousness and softness in a home are related to these notions of comfort, home and family, as the sensorial forms a link between the performing body and the material structures surrounding the body, and thus forms part of the know-how of embodied habits in creating a comfortable environment.

## **6. Conclusions**

This article analysed comfort as more than thermal, connecting warmth and coolness with air, light and material stuff as aspects of comfort that were drawn from an empirical analysis. The perceptions of comfort varied on the one hand with different everyday practices performed in the home, and on the other hand the different aspects of comfort, such as warmth and softness, also influenced the perception of each other. It was shown how the aspects of comfort were interrelated in social practices and sensed through different senses. In this way, the sensorial perspective was used to understand how comfort in social practices is sensed bodily in different ways. This conclusion adds to the understanding of comfort from a social practice approach, as the analysis showed how comfort can be understood as a socially shared understanding related to the home and as a material background for the performance of different everyday practices (e.g. an indoor environment with a certain temperature, air-quality, spaciousness and lighting). The analysis also showed that different practices are performed to obtain the desired comfort. Thus, the different aspects of comfort were sensed and interpreted in relation to social norms, materialities and embodied know-how.

The article was specifically interested in developing understandings within practice theory to better account for, and include, the sensorial. Following the work of Wallenborn and Wilhite (2014) on bringing the body and its perception of the environment into theories of practice, we were interested in going one step closer to include the different types of direct sensing of the environment. With inspiration from sensory ethnography (Pink 2009), we have looked at different aspects of comfort

within everyday practices in homes. Based on this, and with inspiration from Royston (2014) on the sensed know-how of heat management, we propose regarding the sensing of different aspects of comfort as mediating between materiality and practices, through a bodily know-how. The relation between bodily know-how, social norms and material objects is translated and interpreted through the senses and thereby influence perceptions of comfort in practices. Comfort is sensed and perceived individually as part of performing social practices that are collectively shared and related to notions of comfort in different ways. Thus, comfort is sensed through practices and perceived in relation to social conventions and material structures.

This paper analysed comfort aspects and practices that were situated in a context. The Danish detached house has a strong connotation of both privacy and the ideal home for family life. Therefore, the perceptions of comfort in this study are also expressions of specific cultural notions of comfort related to norms of family life, cosiness and homeliness, as well as the Danish climate. Furthermore the material infrastructure of district heating is an important part of this material context. The empirical understandings of comfort in social practices, as analysed here, are thus situated in a specific context of time and space. However, the theoretical discussion on how to interpret senses within practices to understand comfort is also valid outside this context. The conclusions derived from this study may not be generalized, but the theoretical reflections are applicable in other contexts.

Large amounts of energy are consumed to maintain comfortable indoor temperatures in homes, and many policy efforts focus on how to provide this comfort more energy efficiently. Rather than only looking at technical means of satisfying still higher expectations of thermal comfort, this article proposes investigating and debating notions of comfort through the understanding of comfort as bodily sensed and socially interpreted in the practices that are performed in detached houses. The goal of this article was not primarily to propose new directions for energy policy, but rather to nuance the understanding of comfort within this area and contribute with theoretical development in this vein. However, we would also like to point to a few examples of how this research might contribute to another type of energy policy than the strict focus on the overall energy efficiency of buildings.

Based on the insights of the analysis into different comfort temperatures relating to different practices and different rooms, energy policy could focus on how homes can be regulated and developed to accommodate better zoning of temperatures. Some of the interviewees explained that they aired the bedroom in winter to cool it down before sleeping, as it was difficult to achieve a low temperature. This is an example of heat-out-of-place (Royston 2014), which is a waste of heating that might be avoided if the house were built to better accommodate different temperature zonings. This is

especially relevant for newer houses built according to the strictest energy requirements in the building regulations.

Another example of how the analysis points to other directions for energy policy relates to the many different aspects of comfort and how they are interrelated. Increasing expectations to thermal comfort has been shown to be part of the explanation for energy efficiency not delivering the expected energy savings (Gram-Hanssen 2015, Shove 2003, Strengers 2008, 2013). This analysis showed that still higher and more uniform temperatures are not the only way of providing high comfort, as other comfort aspects are also relevant. This points towards experimenting with other ways of building (or renovating) houses, favouring comfort aspects such as light, air and materiality, as well as using knowledge of how these interact with the sensation of heat, e.g. how floor materials feel colder or warmer.

A final example on how this research can give new input for energy policy follows some of the recommendations also given in Royston (2014) and Wallenborn and Wilhite (2014) on energy feedback to households. Demand side management and smart grid approaches to a high degree believe in the informed consumer as part of a future sustainable energy system, though socio-technical research has questioned this in different ways (Friis and Christensen 2016; Yolande Strengers 2013). Feedback to consumers has hitherto been seen to a large degree as digital measurements transformed into visual graphics on in-home monitors or other types of digital communication. The type of research presented here proposes that people sense, perceive and understand through their body as much as through reading figures and text messages. This points to houses that communicate to their inhabitants more directly through bodily sensations, guiding them in the management of their indoor comfort in ways that consume less energy.

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